

## Scientific Inquiry

**PS-1 The student will demonstrate an understanding of how scientific inquiry and technological design, including mathematical analysis, can be used appropriately to pose questions, seek answers, and develop solutions.**

**PS-1.9 Use appropriate safety procedures when conducting investigations.**

**Taxonomy Level:** 3.2-C Apply Procedural Knowledge

### Key Concepts:

Safety procedures

Investigations

**Previous/Future knowledge:** Since kindergarten, students have been expected to use appropriate safety procedures when conducting investigations. In Physical Science, students are expected to use specific safety procedures associated with the investigations in this course.

### It is essential for students to

- Practice the safety procedures stated in every scientific investigation and technological design problem conducted in the laboratory and classroom. Follow safety procedures regarding
  - Personal safety – follow only the designated lab procedures; be sure to understand the meaning of any safety symbols shown, wear proper clothing and shoes for the lab, use protective equipment (goggles, aprons,...), tie back loose hair, never eat or drink in lab room, use proper technique for touching or smelling materials.
  - Work area safety – use only designated chemicals or equipment, keep work area clear and uncluttered, do not point heated containers at yourself or anyone else, be sure all burners or hot plates are turned off when the lab is finished, know the location and use of the fire extinguisher, safety blanket, eyewash station, safety shower, and first aid kit, disconnect electrical devices, follow clean-up procedures as designated by the teacher.
- Safely and accurately practice appropriate techniques associated with the equipment and materials used in the activities conducted in the laboratory and classroom (see PS-1.2 for materials lists).
- Abide by the safety rules in the course safety contract.
- Report any laboratory safety incidents (spills, accidents, or injuries) to the teacher.

### NOTE TO TEACHERS – safety while working with students:

- Textbooks have lists of “Safety Procedures” appropriate for the suggested activities. Students should be able to describe and practice all of the safety procedures associated with the activities they conduct.
- Teachers should weigh the “risks vs. the benefits” of doing any scientific investigation with students.
- Teachers should emphasize the investigation procedures, as well as the safety procedures before doing an activity.
- Lab safety rules should be posted in the classroom and laboratory where students can view them. Students should be expected to learn these rules and pass a test on them showing mastery. Students should understand the importance of these rules and conduct investigations by following them. Putting themselves or others in danger by not following a safety rule is not tolerated.

### NOTE TO TEACHERS – teacher responsibility regarding safety:

- Follow safety and facility guidelines as outlined in the
  - SC Lab Safety CD – CD and training available from the SC Department of Education,
  - Lab Safety flipchart, and
  - SC School Facilities Guide.

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- Science laboratories should be equipped with the proper safety equipment.
- Students should be carefully instructed about laboratory safety rules and assessed to determine mastery of the appropriate techniques before doing any laboratory activities. (Textbooks have safety guidelines and safety notes are included with the laboratory activities.)
- Laboratory safety contracts should be signed by the students and their parents or guardians and kept on file to protect the teacher, school, and school district.
- Laboratory safety violations and accidents should be reported in writing with witness signatures to administrators, duplicated, dated, and kept on file.
- Materials Safety Data Sheets (MSDS) should be kept on file and accessible to all teachers for all chemicals in the laboratory areas. (Several science companies provide CDs with all their MSDS on them for distribution to all science teachers in the school.)
- Each school district and/or school should have a Chemical Hygiene Plan according to OSHA guidelines.

#### Assessment Guidelines

The objective of this indicator is to use appropriate safety procedures, therefore, the primary focus of the assessment should be for students to practice appropriate safety procedures. In this case, students must have an understanding of which safety procedures should be used with given investigations. Assessments may require that students understand which procedures are not appropriate for conducting investigations safely.

In addition to *use*, assessments may require that students:

- Recognize appropriate safety procedures for conducting investigations.
- Exemplify appropriate safety procedures for conducting investigations.
- Classify a procedure as an appropriate or not appropriate safety procedure associated with an investigation.
- Illustrate appropriate safety procedures for conducting investigations.